

The University of Chicago

FORECASTING THE COMMODITY
PRICE LEVEL, 1850-1930
AN APPRAISAL OF 150 PREDICTIONS

A PART OF A DISSERTATION SUBMITTED
TO THE FACULTY OF THE DIVISION OF THE
SOCIAL SCIENCES IN CANDIDACY FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ECONOMICS

1935

PRINTED

By
EUGENE WILEY PETTEE

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LONG-TERM COMMODITY PRICE FORECASTING— 1850 TO 1930. I

E. W. PETTEE¹

THIS study seeks to take stock of the work of those who at one time or another during the last seventy-five years attempted to forecast the future of the commodity price level. Even in these days when the reputations of prophets are at depression lows, such a study is easily justified. Irrespective of the measure of their success or failure, the predictions constitute an interesting chapter in the search for a better understanding of price behavior and determination, and it goes without saying that there is need for all the light we can get on every phase of the problem of the price level. The forecasting aspect of prices is important not only because of its bearing on matters of business practice and public policy, but also because of its close relationship to the other branches of economic prediction. In this connection, commodity prices have been more than a little neglected if one may judge from the scant chapter or two devoted to the price level in the texts on business forecasting. More immediately to the point, there has been no systematic appraisal of the price predictions which can be regarded as remotely comparable with Pro-

¹ Dr. Pettee is instructor in economics at North Dakota State College. The complete title of his study is "Commodity Price Forecasting, 1850 to 1930—an Appraisal of 150 Predictions."

fessor Garfield V. Cox's² appraisal of American business forecasts, or even with Alfred Cowles's³ recent study of the stock-market forecasts.

Price predictions, like general business forecasts, are very difficult to evaluate satisfactorily. Since actual developments have usually proved them right in some respects and wrong in others, it is not possible to say precisely to what extent, if at all, the net effect of the forecasts was helpful. Sometimes the predictions were intentionally made vague and ambiguous, but even when they were not, much still depends upon what interpretation is placed upon certain key words and phrases, upon whether or not the general tone of the forecast as well as the letter of the words is taken into account, and upon the extent to which it is assumed that the forecaster expected his public to remember and to consider still valid certain statements made in earlier market letters. Then there is always the further difficulty of deciding just how much weight in each situation a fair appraisal should give the various elements of the forecast; for a given error in estimating the amplitude, duration, or timing of an anticipated trend may easily be more misleading under certain conditions than under others.

Since our interest is quite as much in the theorizing underlying the predictions as in their degree of success, it has been elected to make a case study of some one hundred and fifty price forecasts rather than to subject still larger numbers to less intensive analysis. A fixed procedure was accordingly observed: First, our own general impression of each forecast, together with direct quotations where feasible, was set down; this was followed by a short criticism and a definite rating; these in turn were followed by a summary of the reasons offered by each forecaster for his attitude. These "reasons" supplied the raw material for an analysis of the assumptions and theorizing underlying the various forecasts. Such a method of rating the predictions frankly grants that all appraisals depend ultimately upon the good judgment of the ap-

² *An Appraisal of American Business Forecasts* (2d ed. rev.; Chicago: University of Chicago Press, 1930).

³ "Can Stock Market Forecasters Forecast?" *Econometrica*, July, 1933, pp. 309-24.

praiser, but it at least provides a definite record of the reasons why each individual rating was assigned. At the same time it yields a valuable by-product in the form of a detailed description of a large collection of noteworthy forecasts, many of which already are all but lost to students of prices. Since space does not permit their reproduction here, we must be content to present the conclusions toward which the study points.

Partly in the interest of simplicity and partly in order that the appraisals should not give the impression of being more exact and impersonal than intended, the essay type of rating rather than a mathematical "point system" is used. These ratings range from "very good" to "very poor" with "fair" characterizing those forecasts which seemed to be about half right and half wrong, or so indefinite that it is an open question whether they were slightly helpful or slightly misleading. Since there have been no perfect predictions, our "very good" rating applies to those which proved to be reasonably accurate in every essential respect; that is, to forecasts which were stated definitely and with confidence and at the same time foretold accurately the direction, time, and duration of the next movement of the commodity price averages. The "very poor" rating is reserved for the predictions which foretold very nearly the opposite of what actually occurred.

The indexes used in checking the results of the forecasts are the wholesale-price index numbers. The chief reason for this is that no other suitable measure of the price level, such as Carl Snyder's index of general prices, was in existence when most of the predictions were made. The forecasters themselves were consequently thinking in terms of wholesale prices and were always ready to accept credit for a correct prediction if Dun's, Bradstreet's, or the Bureau of Labor Statistics index moved in accordance with their forecasts of the future of "commodities." The wholesale price level, at any rate, is probably a very important one from the point of view of business men, for it is more sensitive than the indexes of the so-called general price level and the indexes of prices at retail. Although it is granted that some more inclusive price level than the one measured by our wholesale indexes needs to be considered when matters of monetary theory and public monetary

policy are being considered, it seems highly probable that the forecasters will be able to deal successfully with any index in which we are interested, once they have demonstrated that they can predict dependably the behavior of our leading wholesale-price series. In evaluating the forecasts, we have tried to make allowance for the differences shown by the various leading wholesale-price index numbers in the few instances when these differences seemed to be particularly important.

The forecasts will be considered under the headings of long-term and short-term predictions. The former group includes those that apply to a period of time measured in years, usually not less than five and commonly much more. The latter group, which includes those predictions that apply to a period of a few months, usually six months or less, will be examined in the second installment of this article. We turn now to the forecasts which deal with the longer-range future.

Inasmuch as there existed no systematic price forecasting prior to the World War, one is forced to fall back on the widely scattered predictions made by economists and others both here and abroad as early as 1852 in order to get any clear notion as to what has been done in the way of foretelling the longer-term price trends. The fact that many of these applied to British prices should not detract from their interest, for wholesale prices in the leading markets of the world appear to have followed the same general trends throughout the period under consideration.

Our appraisal of the degree of success of this group of forecasts is based on the assumption that there have been four broad world-wide movements of wholesale prices since 1850. According to our best indexes the first of these was the rise of some 30 or 40 per cent, usually associated with the great gold discoveries, which began around 1850 and ended in this country in 1873.⁴ The second was a long decline which began with the industrial crisis of 1873 and continued with but slight interruptions down to 1896. It amounted all told to about 60 per cent. The reasons usually given for this era of falling prices include the demonetization of silver

⁴ Other factors often mentioned are the reaction from the hard times of 1846-50, speculation, the stimulus of the Crimean War, and later the Civil War.

by Germany, later the attempt of all the leading nations to establish the gold standard, reduced costs of production, improved processes, the superior management of business under the corporate form of organization, and, in general, the tendency of trade and production to outstrip the growth in money supply. The third broad swing of wholesale prices was a rise which began in 1896 and amounted to about 50 per cent by 1914 and to a further 150 per cent by 1920. The rise up to the war is generally accounted for by another great change in the production of gold.⁵ Those who are disinclined to accept the monetary explanation of this rise in prices have emphasized such factors as the Dingley protective tariff (July, 1897), the trend toward monopoly, shortages in supplies of certain commodities due to bad seasons, the higher level of wages, and the various wars.⁶

The last broad movement of wholesale prices was the downswing which began in the summer of 1920. From 1922 to 1929 the general downward drift was scarcely perceptible in the United States on account of the rise of 1924-25, which offset the decline of 1923, and the rise of 1927-28, which offset most of the recession of 1925-26. In 1929, nevertheless, the level of wholesale prices in this country was 7 per cent under 1923; in Great Britain, 14 per cent; in Germany, 4 per cent; and in France, 10 per cent. Taking into account the drastic declines of 1920-21 and 1929-33, in addition to the general weakness of prices in the intervening years, it seems quite plain that the characteristic trend has been downward.⁷

There are various explanations of this price decline. Chief among them are the failure of the world's stock of gold money to

⁵ The annual output of gold had been nearly stationary from 1860 to 1880. During the decade 1880-90 there had been some slight tendency to decline, but no marked change. Thereafter production rose rapidly; it doubled before the close of the nineteenth century and it quadrupled within five years thereafter. In 1900 the output was \$250,000,000; in 1910, \$455,000,000 (dollars of 23.22 grains). Production of gold was maintained at about the 1910 level until 1917.

⁶ Notably, J. L. Laughlin, "Gold and Prices, 1890 to 1907," *Journal of Political Economy*, May, 1909, p. 271.

⁷ Carl Snyder's index of the general price level shows a distinct upward trend from 1922 to 1929, but it also reached an all-time peak in 1920 and declined with wholesale prices from 1929 to 1933.

keep pace with the growth of physical production of commodities, the maldistribution of gold which tended to compel a restrictive credit policy and thus force down prices in certain countries, increased supplies of certain goods due to technological progress, and the maladjustments in production associated with the World War.⁸

In judging the long-range forecasts made during the years in question, one has to recognize the fact that it has never been possible to measure exactly the extent of the foregoing price movements or to settle conclusively the relative importance of the various probable causes. When one considers, further, that the forecasters did not pretend to be able to predict in detail the future of prices, one can readily understand that it would be futile to offer more than an approximate evaluation of this group of predictions. Our ratings are accordingly presented as tentative opinions for whatever they may be worth. More stress will be given the ratings, however, when we deal with the short-term predictions later on.

The upward trend, 1850 to 1873.—The following financial editors and economists predicted an important rise in commodity prices as a result of the Californian and Australian gold discoveries: The editor of the *Bankers' Magazine* (London),⁹ July, 1852; the editor of the *London Times*,¹⁰ July, 1852; Michel Chevalier,¹¹ French economist, 1854; and W. Stanley Jevons,¹² English economist, 1863. William Newmarch, co-author of Thomas Tooke's *History of Prices* (1857),¹³ thought that a rise was not at all unlikely but was unwilling definitely to predict it. Professor Jevons predicted a long period of stable prices after the rise resulting from

⁸ Inasmuch as the major portion of the price decline has occurred since 1929, a complete review of all the probable causes of the fall of prices would necessitate recounting all the supposed causes of the depression. Space does not permit this.

⁹ "Effect on the Price of Commodities from the Increase in Gold," *Banker's Magazine* (London), July, 1852, pp. 246-47.

¹⁰ Quoted in *Bankers' Magazine* (London), July, 1852, pp. 249-52.

¹¹ *On the Probable Fall of the Value of Gold* (Manchester, 1859).

¹² "A Serious Fall of the Value of Gold Ascertained," *Investigations in Currency and Finance* (London, 1884), pp. 49-74.

¹³ *History of Prices* (London, 1857), VI, 227.

the gold discoveries had run its course. No examples of predictions of a reversal of the upward price trend have come to the writer's attention. The forecasts of the period were, on the whole, more helpful than otherwise. On the average, the foregoing predictions may conservatively be said to have deserved the rating "fair to good." The most typical fault of these early efforts was that they hinted strongly that the rise in prices might prove revolutionary; on the other hand, the minimum indicated increase was in no case much more than double the 44 per cent which one index of British prices indicates actually to have occurred.¹⁴

The underlying assumption in every case was that an increase in the supply of gold tends to raise the price level unless the demand for the metal increases as rapidly as the supply. The tendency was to overestimate the future output of gold and to underestimate the future demands upon this enlarged supply. None of the forecasters was able to foresee the tremendous drain of gold to India which J. L. Laughlin has estimated at almost half a billion dollars in the twenty-six years ending 1876.¹⁵

The downward trend, 1873 to 1896.—Mr. George M. Weston,¹⁶ 1878; Sir Robert Giffen,¹⁷ 1879; M. Leroy Beaulieu,¹⁸ 1884; and Mr. M. G. Mulhall,¹⁹ 1885, predicted a long-continued downward drift of commodity prices. These writers were all confident of their predictions, but they did not undertake to estimate in terms of percentages the extent of the decline. Professor W. Stanley Jevons,²⁰ 1879, took exception to the view that the decline was likely to continue over a long period of years, but he, too, was somewhat pessimistic and did not by any means predict a reversal of the trend of prices. No person as prominent as those just

¹⁴ The index computed by John Park Young, *European Currency and Finance* (Commission of Gold and Silver Inquiry, United States Senate, 1925), pp. 436-50.

¹⁵ *History of Bimetallism* (Chicago: University of Chicago Press, 1892), p. 145.

¹⁶ "Solid Bottom in Prices," *Bankers' Magazine*, November, 1878, pp. 358-59.

¹⁷ "On the Fall of Prices of Commodities in Recent Years," *Journal of the Statistical Society*, March, 1879, p. 54.

¹⁸ "The Fall of Prices," *Nation*, May 8, 1884, pp. 401-2.

¹⁹ *A History of Prices since 1850* (London: Longmans, Green & Co., 1885), p. 136.

²⁰ "On the Fall of Prices," *Journal of the Statistical Society*, March, 1879, p. 71.

mentioned seems to have gone on record predicting that the downward movement was but a temporary affair. If the five cases we have reviewed are a fair sample of the more serious attempts at forecasting, one may safely conclude that the forecasters enjoyed considerable success in the seventies and eighties. Our composite rating for the period is but slightly lower than "good."

The earliest four of these predictions were based upon an analysis of the supply of gold relative to the demands upon the prospective supply. The last two emphasized the effect of inventions and improvements in methods of production and transportation, stressing particularly the effect of these on the prices of such staples as grain and cotton.

The upward trend, 1896 to 1920.—The forecasts of this period proved to be less helpful than the earlier long-term predictions we have reviewed, partly, no doubt, because of the occurrence of the World War with its extraordinary effect upon the course of prices. The predictions characteristically were very indefinite as to the time element. Our average rating for the period is slightly better than "fair."

The forecasts may be summarized as follows: G. E. Roberts,²¹ 1901, predicted only moderately higher prices; H. H. Brace,²² 1910, expected a rapid rise for "some years" to be followed by a long period of stable prices; Irving Fisher,²³ 1912, forecast a rise averaging about 2 per cent per year for fifteen years and suggested that an upward trend was likely to be in evidence for at least a generation; W. J. Ashley,²⁴ 1912, predicted stable prices for a while but thought it very likely that a downward trend would be seen later on; and C. A. Conant²⁵ predicted stable prices indefinitely, at least so far as the new gold supplies were concerned.

²¹ "The Influence of the New Supplies of Gold," *North American Review*, April, 1901, p. 262.

²² *Gold Production and the Future of Prices* (New York: Bankers' Publishing Co., 1910), p. 145.

²³ "Will the Present Upward Trend of World Prices Continue?" *American Economic Review*, September, 1912 (reprint), pp. 20-28.

²⁴ *Gold and Prices* (London: Longmans, Green & Co., 1912), p. 32.

²⁵ "Effect of the New Gold upon Prices," *North American Review*, November, 1897, p. 552.

The forecasts of this period, according to our sample, were all based in some measure upon an analysis of the prospective demand for gold as compared with its growing supply. Professor Fisher made one of the most elaborate attempts to apply the quantity theory of money in predicting the future of prices that has ever found its way into print. Mr. Ashley was influenced a great deal by the belief that in the past the long-term trend of prices had been far more typically downward than upward.

The downward trend, 1920 to 1933.—Professor George F. Warren,²⁶ of Cornell, and Thomas Gibson,²⁷ the securities market analyst, were the two forecasters who insisted during the early twenties that prices during the next decade or so were not only headed toward lower levels but that they were likely to go at least as low as the 1913 level. Babson's Statistical Organization,²⁸ the Brookmire Economic Service,²⁹ Moody's Service,³⁰ the the Standard Statistics Service,³¹ and Leonard P. Ayres³² were all equally confident in 1925 or earlier that the general trend would be downward for a number of years, but they appear not to have considered seriously the probability of the pre-war price levels being reached within any ten or fifteen years. The Alexander Hamilton Institute³³ and Allyn Young³⁴ in 1923, and the National City Bank of New York³⁵ in 1922, expressed the belief that there was a definite possibility that there would be some tendency toward lower levels or at least that the probability of a trend downward was greater than the probability of an upward trend. Up until

²⁶ "The Agricultural Depression," *Quarterly Journal of Economics*, February, 1924, p. 213.

²⁷ *Weekly Forecast*, June 15, 1923, p. 3; *Annual Forecast*, January, 1924, p. 141.

²⁸ *Barometer Letters*, November 1, 1921; January 16, 1923.

²⁹ *Forecaster*, January 22, 1923; March 3, 1924.

³⁰ *Investment Letters*, February 16, 1922; May 27, 1924.

³¹ *Daily Trade Service*, December 21, 1921; November 20, 1922.

³² *The Future of Prices and Wages* (Cleveland: Cleveland Trust Company, 1921), pp. 5-7.

³³ *Monthly Letter*, September, 1923; *Business Conditions Weekly*, July 12, 1924.

³⁴ "The Trend of Prices," *American Economic Review (Supplement)*, March, 1923, pp. 6-7.

³⁵ *Economic Conditions*, October, 1922.

1926 the Harvard Economic Society³⁶ predicted that price fluctuations would take place about 50 per cent above the pre-war level, but in 1927 altered its view to the extent of predicting that a downward trend would come eventually if banks continued their policy of sterilizing the gold flowing into the country. Mr. J. O. Downey³⁷ in 1924 predicted a horizontal movement over the remainder of the decade and left the general impression that the factors tending toward higher levels would offset those tending in the opposite direction for a long time to come. Lionel D. Edie³⁸ in 1928 predicted a downward trend over the longer-term future, but argued that prices would not fall before 1935. But it remained for Mr. F. E. Richter,³⁹ in 1924, to insist that the forecasts of a downward trend were poorly founded and to imply quite definitely that the trend was more likely to be upward than downward.

It is true no forecaster was able to foresee very accurately the future course of the price level. The general expectation seems to have been that prices would fall farther than they did in each of the minor cycles, rather than that the bulk of the recession would occur in a long steep decline bringing scores of commodities to all-time lows, all within the span of a single business cycle. If it is correct to assume, however, that the public at large ordinarily takes for granted that the purchasing power of money will remain constant indefinitely, the superiority of the forecasters' views becomes evident.

If one assumes that the forecasts calling for a drastic price decline within ten years were the most helpful while those arguing that prices would remain steady, or at least would not decline, were slightly misleading or worse, it will have been noticed that the forecasting services were generally more helpful than the non-professional services. Table I shows how we have rated them.

In predicting this post-war decline in commodity prices, the

³⁶ *Weekly Letters*, June 10, 1926; February 14, 1925; January 23, 1927.

³⁷ "Future Price Trends," *Proceedings Academy Political Sciences*, November 24, 1924, pp. 246-58.

³⁸ *Money, Bank Credit, and Prices* (New York: Harpers, 1928), pp. 274-75.

³⁹ "The Bearing of Historical Analogy on Predictions," *Bell Telephone Quarterly*, July, 1924, pp. 165-74.

most popular argument was that a shortage or redistribution of gold would cause prices to decline, but there was little or no disposition to argue that the world credit structure was showing any particular signs of becoming badly strained or that the shortage of gold would lead to any spectacular liquidation of credit.

More consistently put to good account by the forecasters was the argument that the great productive capacity of the world, together with cost-reducing factors such as the increasing use of machinery, would force prices to lower levels.

TABLE I
RATINGS ASSIGNED PROFESSIONAL AND NON-PROFESSIONAL
FORECASTERS, 1920-33

Rating	Number of Services	Bankers and Economists	Total
Very good.....	2	0	2
Good.....	4	1	5
Fair to good.....	1	3	4
Fair.....	1	0	1
Poor to fair.....	0	2	2
Poor.....	0	1	1
Very poor.....	0	0	0
Total.....	8	7	15

None of the forecasters foresaw or emphasized the political disturbances which are now often mentioned as having contributed to the world-wide recession in commodity prices. Nor did they succeed in drawing useful inferences from the outlook for the prices of particular commodities. Of all the forecasters whose predictions we have examined, the only one who made any attempt to use this approach was Mr. Richter, and he concluded that there was little probability of the prices of any of the basic raw materials falling sufficiently to affect the general price averages.

Entire period, 1852-1930.—Viewing the predictions as a whole, our study strongly indicates that the forecasters succeeded fairly well in foretelling the longer-range future of the commodity price level ever since 1852. The ratings we have assigned the predictions are summarized in Table II.

Our sample of predictions probably shows long-range price forecasting in its most favorable light, for in nearly all instances the forecasts were made after rather than before the beginning of the four great price movements. It has been impossible to include an equal number of cases dated shortly before the several changes in trend for the simple reason that the forecasts do not exist. Sufficient interest in the price level to draw out studied predictions evidently developed only in those periods when it became evident that something was happening to prices. Once a new movement started, people wanted to know whether or not it was going to be

TABLE II
SUMMARY OF RATINGS OF FORECASTS OF 1852-1930

Movement Forecast	Number Rated Higher than Fair	Number Rated Fair	Number Rated Lower than Fair
Upward trend, 1850-73.....	4	0	1
Downward trend, 1873-96.....	4	1	0
Upward trend, 1896-1920.....	3	1	2
Downward trend, 1920-33.....	11	1	3
Totals.....	22	3	6

a temporary affair, and the writers whose views were examined were attempting to answer this question. If one wishes to insist that the economists, bankers, and financial editors of the past ought to have predicted when they did not, it is, of course, one's privilege to pronounce them failures as forecasters. But no individual could fairly be charged with such a responsibility—at any rate, not up until the “rise” of the professional forecasting service a decade or so ago.

So far as we can discover, no new technique for deriving long-range price forecasts has been developed and tested. Mathematical formulas and forecasting charts have not been in evidence; on the contrary, the predictions have consisted for the most part merely of opinions based upon whatever information was available. In only an occasional instance does there seem to have been a conscious effort to apply the quantitative method of analysis. The best example of this is Professor Fisher's forecast of 1912, in

which each item in the equation of exchange was investigated to see how rapidly it had grown in the past and how rapidly it could be expected to grow in the future. The forecast did not prove to be especially accurate, and it seems likely that it would have proved still less correct had not the World War occurred. Another well-known instance in which statistics were in the foreground was Chevalier's forecast of seventy years ago. This, like Professor Fisher's effort, was not eminently successful. It is the writer's impression that these predictions were not fundamentally different from the others. They were based upon the same premises as the majority of the forecasts which made no attempt to estimate the future gold production and future demands upon gold in terms of dollars and cents. Estimates were none the more reliable because they were stated in concrete terms. Events such as the demonetization of silver by certain countries, the absorption of large supplies of the precious metals by India, technological developments, and wars were not foretold by statistical studies, no matter how elaborate these happened to be.

Two-thirds of the forecasts were based very largely upon the theory that changes in the supply of money or credit were likely to determine the future course of the general average of prices. Table III shows the ratings we have given the various predictions which were based to a great extent on such an assumption.

The twenty-two forecasts in this group were rated, on the average, better than neutral as may be seen from the fact that fifteen were considered more than half right as compared with four definitely more misleading than helpful. In view of the fact that "other things" usually do not "remain the same," it is not surprising that difficulties were encountered in applying the quantity theory to the problem of price forecasting. The task of foretelling the future of the gold supply was a problem in itself, but it was even more difficult to estimate the demands upon the increasing supply of money.

The experience of the forecasters working conspicuously from the side of "goods" is summarized briefly in Table IV. Out of a total of thirty-one predictions, only the eight listed in Table IV can be said to have placed as much or more emphasis upon the

prospective demand or supply of commodities as upon the analysis of the outlook for gold or credit. In all of these cases the non-monetary approach was used in forecasting a continuation of the great downward swings of the price level. The central argument was that more efficient production methods and increasingly effective competition, foreign and domestic, were likely to drive prices

TABLE III
RATINGS ASSIGNED FORECASTS STRESSING
MONETARY CONSIDERATIONS

Forecaster and Date	Rating
<i>Bankers' Magazine</i> (London), 1852.....	Fair to good
<i>London Times</i> , 1852.....	Fair to good
Chevalier, M., 1852.....	Fair to good
Jevons, W. S., 1863.....	Good
Jevons, W. S. (very long term), 1863.....	Poor
Weston, G. M., 1878.....	Good
Giffen, Robert, 1879.....	Good
Jevons, W. S., 1879.....	Fair
Conant, C. A., 1897.....	Poor to fair
Roberts, G. E., 1901.....	Fair to good
Ernest, Howard, 1907.....	Good
Brace, H. H., 1910.....	Poor to fair
Ashley, W. J., 1912.....	Fair
Fisher, Irving, 1912.....	Fair to good
Alexander Hamilton Institute, 1923.....	Fair to good
Brookmire Economic Service, 1923-24.....	Good
Harvard Economic Service, 1922-27.....	Fair
Standard Statistics Service, 1921-23.....	Good
Fisher, Irving, 1921.....	Fair to good
Young, Allyn A., 1923.....	Fair to good
Warren, George F., 1921-26.....	Very good
Edie, Lionel D., 1928.....	Poor to fair

much lower over a period of time. With the exception of Moody's Service and M. Leroy Beaulieu, the disposition was not to take issue with the quantity theory, but merely to emphasize the probable effect of more and cheaper goods as much or more than the monetary factors. As Table IV shows, these predictions were uniformly helpful.

The behavior of prices in the past seems to have been given surprisingly little consideration by the forecasters. The ratings

assigned the few predictions which gave special attention to price history as a possible clue to the future are tabulated in Table V.

In four of the six instances, the forecasters were able to profit somewhat from historical analogy in judging the future course of prices.⁴⁰ Past experience, for example, strongly indicated that prices would revert to their former levels following the World

TABLE IV
RATINGS OF FORECASTS STRESSING
"GOODS" CONSIDERATIONS

Forecaster and Date	Rating
Beaulieu, Leroy, 1884.....	Good
Mulhall, M. G., 1885.....	Good
Babson's Organization, 1921-24.....	Good
Gibson, Thomas, 1923-27.....	Very good
Moody's Service, 1920-26.....	Good
Standard Service, 1921-27.....	Good
Ayres, L. P., 1921.....	Good
National City Bank, 1922.....	Fair to good

TABLE V
RATINGS OF FORECASTS STRESSING HISTORICAL ANALOGY

Forecaster and Date	Rating	Comment
Ashley, W. J., 1912.....	Fair	Analogy somewhat helpful
Babson's, 1921-24.....	Good	Analogy helpful
Moody's, 1920-26.....	Good	Analogy helpful
Ayres, L. P., 1921.....	Good	Analogy helpful
Harvard, 1922-27.....	Fair	Differences stressed
Richter, F. E., 1924.....	Poor	Differences stressed

War, but it was inconclusive so far as such important matters as the time element were concerned. Of the forecasters who made specific reference to history as having a bearing upon the long-range outlook we have noted only two whose predictions were not the better for it. Mr. Richter and the Harvard Service took the unfortunate position that conditions were so different in 1924 from what they had ever been that it was a serious fallacy to anticipate lower prices on the basis of historical analogies.

⁴⁰ The rating, however, does not necessarily measure the helpfulness of the analogy, for other considerations also entered into the final forecast.

The question cannot be answered conclusively as to whether or not there was more reason to advance the "goods" argument in the period 1873-96 and in the years following the World War than there was in the period from 1896 to 1914. In many respects it is true that the period from the close of the Civil War to near the close of the nineteenth century was one of development and expansion unparalleled in our history, for it is during this period that there occurred the gradual pushing of the frontier westward, the tapping of new resources, the opening up of vast areas of rich agricultural land, and the expansion in our transportation system.

TABLE VI
AVERAGE ANNUAL INCREASES IN VOLUME OF
PHYSICAL PRODUCTION

Period	Years	Per Cent Increase
1849-73.....	24	4.6
1872-96.....	24	7.5
1896-1920.....	24	4.9
1896-1914.....	18	4.6
1919-29.....	10	2.7
1915-24.....	14	2.1

The Warren and Pearson index⁴¹ of the volume of physical production of basic commodities bears out the notion that production in the United States increased more rapidly from 1873 to 1896 than in any of the other periods, even though Warren and Pearson themselves have insisted that the great price changes can be explained only from the side of gold. This index shows average annual increases about as tabulated in Table VI.

When one considers the production of the whole world, however, our best index indicates that the growth of the physical volume of production, except in war time, has been at an exceedingly even rate. Thus, according to Mr. Carl Snyder, the average annual increases for the periods in question were about as shown in Table VII.⁴²

⁴¹ *Prices* (New York: Wiley & Sons, 1933), pp. 44-45.

⁴² These rates are based on Carl Snyder's figures for the world physical production (converted to the 1910-14 base by Warren and Pearson, *ibid.*, pp. 48-49) back

Since the decline in prices was international in scope, the failure of this index to show a striking rise from 1873 to 1896 tends to throw doubt on the theory that great technological advances in industry and agriculture were causes of particular significance in that era.

As to the period of rising prices from 1896 to 1914, it is noteworthy that toward the close of the nineteenth century two major developments, other than the new gold discoveries, marked the end of the earlier era of declining prices, namely, the gradual passing of the American frontier and the growth of restraints upon

TABLE VII
AVERAGE ANNUAL INCREASES IN WORLD-VOLUME
OF PHYSICAL PRODUCTION

Period	Number of Years	Per Cent of Increase
1850-73.....	23	4.2
1873-96.....	23	4.2
1896-1913.....	17	4.0
1897-1920.....	23	2.4
1918-29.....	11	5.0
1920-29.....	9	3.7

price competition, particularly in manufacturing and transportation. The latter include such restraints as consolidations, monopolies, rate regulations by government, trade ethics, the branding of goods, and high protective tariffs.

Unlike Carl Snyder and Messrs. Warren and Pearson, Professor F. C. Mills⁴³ argues that the American economy has moved for-

to 1865. From 1850 to 1865 the data are Warren and Pearson's. By measuring from different dates it is possible to draw a different conclusion from Mr. Snyder's data. Thus, Rufus S. Tucker believes it to be significant that the index in question rose most rapidly from 1865 to 1880 and between 1921-29, both of which were periods of falling "general" prices. See "Gold and the General Price Level," *Review of Economic Statistics*, January 15, 1924, pp. 8-16.

⁴³ *Economic Tendencies in the United States* (New York: National Bureau of Economic Research, 1932), p. 310. Mr. Mills's figures for the annual rate of increase are not impressive at first glance. He puts the 1901-13 rate at 3.1 per cent and the 1922-29 rate at 3.8 per cent. The corresponding rates per head of population are 1.3 per cent and 2.4 per cent.

ward at a more rapid rate since the war. Measuring from 1901 to 1913 and from 1922 to 1929, he finds a higher post-war rate of growth of some 1.3 per cent per year in per capita physical production in the United States. He tells us that at the pre-war rate sixty-three years would have been required for a doubling of the individual's share in the annual output of the country, while at the rate of increase prevailing between 1922 and 1929, such a doubling would have required only twenty-nine years. The specific commodities in which we have had greatly increased supply and decreased costs since the war include such basic materials as wheat, sugar, coffee, copper, tin, petroleum, rubber, paper, silk, and rayon.

Despite Professor Mills's evidence, it is very doubtful that production as a whole increased since the war at an unusually rapid pace either in this country or in the world at large. We have already seen that the Warren and Pearson index shows a less than customary rate of increase since 1919, and that Carl Snyder's index of world-production of basic commodities shows little or no increase in the rate of growth, depending on the year from which we measure. Carl Snyder,⁴⁴ interpreting his own data, insists that he can find little evidence, either for the world or the United States, that the rate of increase in production materially differed from the normal rate of increase in the years immediately preceding the crash of 1929.

In accounting for the failures of the forecasters, it is, of course, easy to trace many of them to an inability to foresee the trends of such crucial variables as gold output, monetary policies, wars, technological development, and the growth of trade and commerce. A few examples will illustrate.

The *Bankers' Magazine*, the *London Times*, and Chevalier, from 1852 to 1854, were all correct in assuming that the gold discoveries would lead to a rise in prices, but they overestimated the future output of gold by as much as 50 per cent. Largely in consequence of this error, these writers predicted a greater rise in the price level than actually occurred. Others employing the same

⁴⁴ "Overproduction and Business Cycles," *Proceedings of the Academy of Political Sciences*, June, 1931, p. 358.

general theory of prices met with varying degrees of success in their forecasts. Giffen, 1879, underestimated both gold production and the growth of trade, and reached a passable conclusion. Conant, 1897, and Roberts, 1901, both estimated very accurately the future output of the gold mines but evidently overestimated the future rate of increase in the demand for gold. Their predictions were more than a little misleading.

On the other hand, it sometimes paid well to guess wrong! Thus the Standard Service in 1921, the Brookmire Service in 1923, and G. F. Warren in 1923, all predicted a long-term decline in the wholesale commodity price level on the assumption that this country would gradually lose its abnormal supply of gold. As a matter of fact the supply of monetary gold held by the United States continued to increase rather than decline up until 1932. Yet by that time prices had already reached very low levels as though in accordance with the foregoing predictions. To take a less recent example, Jevons' prediction of 1879 was the more accurate because of his use of the untenable argument that the prospective failure of the sun's activity to increase was likely to result in poor harvest, poor business, and lower prices.

Were it to be asked, however, if there is either a positive or negative correlation between the success attained by the forecasters and the quality of the reasoning used, no unqualified answer can safely be ventured. It has not been possible to classify each prediction according to the soundness of the logic underlying it, chiefly for the simple reason that various arguments were frequently offered in support of a given position, so that there is no way of telling just how much bearing each had on the final forecast. But there is also the further difficulty that it is not possible conclusively to identify and weigh the causes of the various price movements.

[To be continued]

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SHORT-TERM PRICE FORECASTING, 1920-29. II*

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THIS appraisal of the short-term forecasts is restricted to those made during the decade of the 1920's; for it is only since the close of the World War that continuous and systematic attempts have been made to forecast economic events. Practical considerations make necessary the further limitation of including only American forecasts.

Even within such limits it is necessary to eliminate many forecasts from consideration in order to keep the number from becoming too large to handle effectively in a case study of this kind. So long as a line has to be drawn somewhere, only those predictions made within some six months of each cyclical turning-point are included, the assumption being that the forecasts of these critical months are of more general interest—and certainly not less significant—than those of the intervening periods. In dealing with the professional forecasters whose predictions were more or less continuous, a maximum of three ratings per forecaster is given for each half-year interval. This particular number is taken because fewer than three would not give a fair idea of the results achieved and more than that is scarcely justified in view of the fact that the forecasts generally are not altered much from week to week. It should be noted that the confining of consideration to the months shortly before the turning-points leads to a stricter test

* This is the second of three articles on price forecasting. As explained in the first instalment appearing in the April, 1936, issue of this *Journal*, the present article attempts to set down some of the main conclusions suggested by a detailed analysis of some one hundred and fifty different price forecasts. In the original study each appraisal was explained individually and supported by the appropriate quotations, but space limitations here permit only a suggestion of the nature of the various forecasts and of the reasons for the ratings assigned. The particular services included in the study are the ones whose forecasting letters happened to be available at the time of the investigation. Most of the statistical data incidental to the main study were taken from the *Standard Statistical Bulletin: Base Book Issue*, 1931-32.

of the forecaster's art than was applied to the long-term forecasts in the first article of this series.

The downturn of 1920.—The decline in prices which set in around July, 1920, was one of the most drastic on record. It was international in scope, and in this country caused the wholesale price index of the Bureau of Labor Statistics to fall 27 per cent by the end of the year, or an average of over 4 per cent per month for six consecutive months.

At first blush it seems that this should have been an easy recession to predict. Business had been active for a long time; speculation had carried land, commodities, and securities to great heights; credit expansion had reached the straining-point; interest rates were high and were going higher; and early in 1920 an outflow of gold had definitely set in. In retrospect, among the more significant signs of the impending recession were the increases in the rediscount rates of the central banks both here and abroad, the Japanese crisis, and the disappointing spring trade.

There were, on the other hand, a number of factors which tended to confirm the popular belief that high prices had come to stay. The bumper crops of 1919 had sold at high prices, bringing the highest aggregate returns of all time, and the crop prospects for 1920 were good. There was generally supposed to be an inexhaustible demand for goods of all sorts. Europe was said to be desperately short of foodstuffs, and the papers were full of stories of construction projects being planned. The most common answer to those who prophesied disaster was that the country had not gone through an era of construction, that there were shortages of goods instead of the oversupplies so characteristic of the top of a business cycle, and that the country possessed a new banking system which could probably deal with any situation likely to arise.

The forecasting services were able to make an encouraging showing during the months preceding the 1920 collapse in prices. Twelve of the sixteen predictions we examined impressed us as being definitely more than half right as compared with only two definitely misleading and two approximately neutral. The indi-

vidual rating⁴⁵ of seven services covering three periods of two or three months each are shown in Table VIII.

The non-professional forecasters⁴⁶ were both less definite and less accurate in their predictions, judging from the six of these published during the months with which this study deals. Only two of them were able to give even slightly helpful predictions as against four which were quite definitely on the misleading side. The ratings are given in Table IX.

The statistical approach seems to have played an important part in the predictions of only three of the forecasters included in our survey, namely, the Harvard, Brookmire, and Babson serv-

TABLE VIII

Service	Jan.-Feb., 1920	March-May, 1920	June-July, 1920
Babson's.....	Very good	Very good	Fair
Bankers'.....	Fair	Poor	Very poor
Brookmire.....	Very good	Very good	Very good
Gibson.....	Good	Good	Good
Harvard.....	Fair to good	Fair to good	Fair to good
Moody's.....	Good	.....	.....

ices. The Harvard Economic Society interpreted its Index Chart as indicating a significant fall in business and prices by early summer but concluded that certain new elements, which were not reflected in the chart, would prevent a serious decline. The

⁴⁵ As explained in our earlier article, the ratings range from very good to very poor, with fair characterizing those predictions around the neutral zone. It is an open question whether the fair forecasts were slightly helpful on the balance or slightly misleading. Very good forecasts were not perfect but were mostly right in all important respects and undoubtedly helpful.

⁴⁶ D. F. Jordan, "Where Are We in the Price Cycle?" *Bankers' Statistical Service*, July 20, 1920; R. C. Meeker, "Improbability of Decrease in Prices," *Monthly Labor Review*, January 17, 1920, p. 400; W. C. Mitchell, "Prices and Reconstruction," *American Economic Review*, March, 1920, pp. 129-55; H. G. Moulton, "The Banking and Price Situation," *American Economic Review* (suppl.), March, 1920, pp. 156-75; "Production and Prices (Editorial)," *New Republic*, June 2, 1920, p. 4; E. M. Patterson, "Prospective Changes in the Price Level," *Annals of the American Academy of Political Science*, May, 1920, pp. 8-12. Irving Fisher's well-known prediction that we were on a permanently higher price level was made in June, 1919, which was more than a year before the break in wholesale prices.

Brookmire prediction of an important price decline by summer was based largely on the assumption that the banking-stock-market price sequence would hold in 1920 as it had in many previous instances. Babson's Service was duly impressed by the fact that the Babsonchart indicated that business and prices had long been above normal and were bound to come down, but the chart unfortunately gave no very definite clue as to the time of the probable reversal of trend.

The theory that the limitations of our credit system would soon call a halt to expansion and lead to a recession figured strongly in the helpful predictions of Thomas Gibson, E. M. Patterson, H. G. Moulton, the Brookmire Service, and Babson's

TABLE IX

Forecaster	Date of Forecast	Rating
Jordan, D. F.....	July, 1920	Poor
Meeker, R. C.....	Jan. 1920	Poor
Mitchell, W. C.....	Mar. 1920	Poor to fair
Moulton, H. G.....	Dec. 1919	Good
<i>New Republic</i>	June, 1920	Poor
Patterson, E. M.....	May, 1920	Good

Organization. The Harvard view was that the Federal Reserve Banking System could be counted on to prevent a drastic deflation of credit and prices, and Dr. Mitchell "guessed" that the central banks would successfully attempt to control the situation before it was too late.

A second consideration which stood the forecasters in good stead was the anticipated slump in the American export trade due to the increasing productive power of Europe. Thomas Gibson considered this the main reason why a high price level could not be maintained in this country. Babson's, Mitchell, and Moulton also used this reasoning to advantage, but the Bankers' and Harvard services were impressed by the way the foreign business was holding up rather than by the prospect that it would fall off.

The belief that there existed a great shortage of goods proved distinctly detrimental to the predictions of Jordan, Meeker,

Mitchell, the *New Republic*, the Bankers' Service, the Harvard Service, and, to a lesser extent, the Babson Service toward the middle of the year. The second assumption playing a dominant rôle in several of the unsuccessful predictions was that high and rising costs pointed toward a continuation of a high level of prices.

The forecasters, as a group, made surprisingly little reference to such suggestive developments as the Japanese crisis; the declining prices in England, Germany, and other European centers; the sharp declines in the prices of certain basic commodities in this country; the shift in business sentiment which occurred early in the spring of 1920; and the adverse corporate-earnings reports which were becoming fairly conspicuous long before July.

Forecasting the upturn of 1922.—The rise in wholesale prices which set in around the opening of 1922 was not impressive compared with the extreme movements during and immediately after the war, but, if one compares it with most peace-time fluctuations, it will be seen to have been of substantial proportions. The Bureau of Labor Statistics index rose 12 per cent between January and December, and other wholesale indexes rose as much as 21 per cent during the year.

The rise in prices was international in scope, the upturn occurring earlier in a number of important countries than it did in the United States. In Germany, France, Italy, the Netherlands, and Denmark, the low of the 1920-21 recession was seen between May and November, 1921. The most fundamental common cause of the price upturn in Germany, France, Italy, Austria, and Hungary was the failure of the governments to balance their budgets. In Germany inflation was well under way by the opening months of 1922.

The theory that improving general business led to the rise in prices was rather well borne out by the events of 1922. General business turned upward in March, 1921, and moved fairly steadily toward higher levels throughout 1922 and through the spring of 1923.⁴⁷ The stock market, too, upheld its reputation as

⁴⁷ It should be noted, however, that our present indexes of business activity were not in existence in 1922.

a forecaster of the commodity markets; for it struck its low in August and then began a rather steady climb, with no important setback, until the spring of 1923.

Those who favor the monetary explanation of the price rise can point to our rising gold reserves, which increased from 2,966 million dollars in January, 1921, to 3,333 million dollars by the end of the year; to the liquid condition of the Federal Reserve banks whose reserve ratio had increased from 44.5 in January, 1921, to 73.1 in December; and to the steady decline in interest rates reflected by a decline in the New York Federal Reserve bank rate from 7 per cent in April to $4\frac{1}{2}$ per cent in November, 1921. The monetary explanation is strengthened by the fact that the general price level as well as wholesale prices registered an increase in 1922.

Professor Morris A. Copeland suggests that this rise in the wholesale price indexes can be explained by changes in the supply conditions in a few industries where the output is not closely or quickly adjusted to demand, and he points to the bituminous coal strike which resulted temporarily in high prices for fuel.⁴⁸ Still another possible explanation is that the rise was mostly the rebound from the excessive deflation of 1920-21.

The forecasting services were reasonably successful in foretelling the 1922 price rise. Over a period of six months four of the six services were definitely helpful, and the others were at least slightly helpful much of the time. Of the 18 predictions, 13 were more than half right, 3 were about half right, and only 2 were clearly more wrong than right. The individual ratings are given in Table X.

During the last quarter of 1921 all the services were fairly confident either that the decline would soon end or that the trend would turn upward in the not distant future, but by the opening of 1922 two of the forecasters became convinced that there would be no rise during the year. Prior to October, 1921, most of the forecasts were either vague concerning the prospective upturn or not much more than half correct in their conclusions.

⁴⁸ "Causes of Changes in the Wholesale Price Level," *Journal of American Statistical Association*, March, 1930, p. 166.

The chart barometers on the balance were not strikingly helpful. As a matter of fact, the degree of accuracy of the three forecasters using the charts was practically the same as that of the three not using them. The monetary considerations contributed materially to the helpful conclusions of the Brookmire, Gibson, Standard, and Harvard organizations; for all of these held that the easing of credit and the lowering of interest rates strongly indicated higher commodity prices. Babson's, on the other hand, argued that bankers were wary of speculative borrowing and that solvent borrowers probably would not require more funds under the then-existing conditions even if credit were available at much lower rates. The "goods" approach was used to some advantage

TABLE X

Service	July-Sept., 1920	Oct.-Dec., 1921	Jan.-Feb., 1921
Babson's.....	Fair	Fair to good	Poor
Brookmire.....	Fair to good	Good	Good
Gibson.....	Fair to good	Fair to good	Fair to good
Harvard.....	Fair	Fair to good	Very good
Moody's.....	Fair to good	Good	Poor
Standard.....	Fair	Fair to good	Good

by Standard, Harvard, and Moody's, all of whom were impressed by a supposed shortage of goods; but Babson's thought the unpromising foreign demand for our goods would operate against an early upturn of prices. The forecasters seem not to have seen any such significance in the coal strike as Professor Copeland in retrospect believes it may have had.

The downturn of 1923.—The 1923 downswing of wholesale prices began in April or May and amounted to around 10 per cent, the bulk of the decline occurring in a four-month period measuring from May to September.

There is no very convincing evidence that it is necessary to look outside the United States for the causes of this recession, for only Italy and Sweden of the important European countries experienced a decline as extensive as our own. Several countries—notably Germany, Austria, and Russia—on the contrary were

witnessing skyrocketing prices at this time as a consequence of unbalanced budgets and depreciating currencies.

In support of the monetary explanation of the price recession in this country it can be said that the Federal Reserve Bank of New York raised its rediscount rate in February, 1923, from 4 per cent to $4\frac{1}{2}$ per cent and that the twelve central banks reduced their holdings of government securities from 416.8 millions of dollars in January, 1923, to 227.3 millions in April and to 97.5 millions three months later. Against this argument it can be urged that the reserve banks did not actually force any widespread contraction of credit; for, if account is taken of an increase in bills discounted and bills bought, total Federal Reserve credit outstanding declined only 47.2 millions of dollars during the first quarter of 1923. It can also be said that money was relatively cheap and plentiful; for, though interest rates were slightly higher than in 1922, the prevailing rate of 4.98 per cent on choice double-name paper was not regarded as high. Then, too, the total loans and discounts of the member banks registered a steady increase month by month. Still another point against the monetary explanation is that Carl Snyder's index of general prices, unlike the wholesale price indexes, held a steady course throughout 1923.⁴⁹

General business turned downward a little later than commodities did, according to the Standard Index of Production, but the stock market and wholesale prices began their declines at about the same time. The specific commodities that declined more than the averages included building materials, sugar, cotton, and petroleum. Farm prices as a whole fell somewhat less than the general average, and they recovered more promptly.

The year 1923 proved to be a bad year for the forecasters. Only two of the five services met with even a moderate degree of success, and three were definitely and consistently misleading. As Table XI shows, nine of the predictions were found to be misleading, one indifferent, and five somewhat helpful.

The Brookmire and Harvard forecasting charts both pointed

⁴⁹ Snyder's index rose from 163 in January to 165 in March and fluctuated between 165 and 166 during the rest of 1923.

toward incorrect conclusions in the 1922-23 period, but the Babsonchart contributed toward a series of helpful predictions in that it indicated that the business readjustment was still incomplete.

Monetary considerations figured with particular prominence in the Harvard and Standard misleading predictions; for these services looked for a heavy credit expansion on the basis of the ample credit resources of the country. No forecaster predicted lower prices on the strength of the restrictive credit policy of the Federal Reserve banks, which is held by some authorities to have been the cause of the decline.

TABLE XI

Service	Oct.-Dec., 1922	Jan.-March, 1923	April-May, 1923
Babson's.....	Fair to good	Good	Fair to good
Brookmire.....	Poor to fair	Fair	Poor
Gibson.....	Fair to good	Fair	Fair to good
Harvard.....	Poor to fair	Poor	Very poor
Standard.....	Poor to fair	Poor	Very poor

Mr. Gibson emphasized chiefly an anticipated increase in competition from abroad; Babson's was impressed by the lack of any shortage of commodities and the large productive capacity of the country. The other services were inclined to be impressed by such factors as higher labor and raw-materials prices, reduced supplies due to labor and transportation difficulties, and the great demand for goods.

The upturn of 1924.—The price rise which began in July, 1924, amounted, all told, to some 10 or 12 per cent and proceeded at a steady rate as long as it lasted, which was about nine months. Prices in such countries as England, Italy, Sweden, Japan, and the Netherlands rose like our own during the second half of the year.

The usual explanation of this movement is the monetary one. In this connection it is pointed out that the banking authorities reduced the rediscount rate at the New York Federal Reserve

Bank three times within the year, bringing the rate from $4\frac{1}{2}$ per cent, where it stood in May, to 3 per cent in August. Besides lowering the discount rate, the reserve banks purchased government securities to the extent of some 374 millions of dollars, presumably with the intention of encouraging a rise in prices. The other side of this argument is that the total reserve-bank credit, far from increasing, showed a material decrease for the reason that the increase in bills sold on the open market and the decline in bills rediscounted more than compensated for the government securities bought. Irrespective of the central banking policy, the monetary explanation is strengthened by the fact that the gold stock of the country was steadily rising, as were demand deposits and loans and discounts, while interest rates continued to fall from a level already regarded as low. It is still further strengthened by the fact that the general price level as well as wholesale prices rose in 1924.

The individual prices which rose more than the averages in 1924 include petroleum, hogs, wheat, and corn. In general, crops were relatively good in this country and bad abroad. The stock market, general business, and wholesale prices all turned upward at about the same time.

The services were almost as unsuccessful in predicting the 1924 rise as they have been in foretelling the preceding decline. Only two of the six services covered gave helpful predictions over the six-month period next preceding the July upturn. Of the 18 predictions, 6 appear to have been mostly right, 4 about neutral, and 8 more wrong than right. As Table XII shows, the forecasters were comparatively accurate as the time of the turning-point approached.

The monetary approach was used to best advantage by Thomas Gibson, who was much impressed by the evidence that the banks were pursuing an inflationary policy but was convinced that the rise could not last more than six to eight months as long as other countries could not share in the same abundance of gold and credit. The favorable money and credit situation also figured indirectly in the Harvard and Brookmire forecasts, but in these instances the time lags between certain statistical series de-

terminated in large measure the final badly timed forecasts. The Standard Service deliberately rejected the easy-money signal on the ground that monetary considerations were of little significance so far as the short-term future was concerned.

Babson's Organization placed major emphasis upon supply-demand prospects, stressing such factors as larger supplies of goods coming to market, excess producing capacity, a prospective increase in foreign competition, and expanding inventories—all of which led toward incorrect predictions. Unlike Babson's, Standard Service held that production was being curtailed, that dealers' inventories were not large but that wages and materials costs were high, and concluded most of the time that prices would

TABLE XII

Service	Dec., 1923— Feb., 1924	March-May, 1924	June-July, 1924
Babson's.....	Poor	Poor	Poor to fair
Brookmire.....	Poor	Very poor	Poor to fair
Gibson.....	Fair	Fair to good	Good
Harvard.....	Poor	Fair to good	Fair to good
Moody's.....	Fair	Fair	Fair
Standard.....	Fair to good	Poor	Good

accordingly rise. That the demand for goods was bound to suffer so long as unemployment existed was a characteristic argument of Moody's, but the consideration which proved most useful to this service was that the second half of the year in the past had frequently seen firm or rising commodity prices.

The downturn of 1925-26.—Although the wholesale price level was comparatively stable during 1925 and 1926, there was, nevertheless, a clearly defined downward drift which began near the opening of 1926 and ended in the spring of 1927. The recession amounted to some 8 to 20 per cent over a term of from sixteen to eighteen months, depending on which index of wholesale prices one uses. All the leading indexes show a noticeable decline during the first quarter of 1926.

The Federal Reserve banks are commonly said to have caused this general downward drift in prices; for not only was the redis-

count rate raised from 3 to $3\frac{1}{2}$ per cent in February and from $3\frac{1}{2}$ to 4 per cent in January, 1926, but, in addition, the central banks' holdings of government securities were reduced from an average of 371.3 millions of dollars in 1924 to 347.2 millions in 1926. A third more or less deflationary policy was the publication of brokers' loans, which may have intensified caution on the part of certain business men who would otherwise have borrowed on a larger scale.

The view that the price decline had its origin in the monetary situation is strengthened by the fact that prices in fourteen leading countries having a gold basis declined on an average about 12 per cent between the first quarter of 1925 and the middle of 1927, supposedly due, in part at least, to the return of England and a number of other countries to the gold standard. Against the theory that a small export of gold and a deflationary banking policy caused the decline in this country, it can be urged that the bank loans and investments of the reporting member banks increased by 1,900 millions of dollars during the months of price recession and that the deposits of the banks increased by about 1,400 millions during the same period. A further point against the monetary explanation is that Snyder's index of general prices averaged one point higher in 1926 than in 1925, having declined not more than three points from its 1925-26 high at any time during the year.

Those who believe that the decline in the wholesale index numbers is explained by the conditions in a few key industries can point to the bumper cotton crop and the failure of rubber restriction. The decline of various groups of commodities between early 1925 and the middle of 1927 were as follows: farm products, 18 per cent; non-agricultural prices, 10 per cent; silks, 28 per cent; grains, 32 per cent. The price of rubber fell 60 per cent in a single year, beginning the middle of 1925, and cotton fell 27 per cent during the same months.

An unusual feature of the period was that business activity did not follow commodities downward in 1925-26. The stock market failed to forecast the weakening of wholesale prices, for it rose throughout 1925 and the early months of 1926.

The forecasts were more than a little misleading during the closing months of 1925 and the opening months of 1926. Not one of the services covered was able to predict the downward drift of commodities as much as five or six months in advance. Three months before the main turning-point, two of the five services spoke of a possibility of unsettled prices later on, but three still predicted firm or higher prices for at least several months. On the other hand, none of the forecasts was dangerously misleading, for the worst done by any service was to predict a moderately rising trend instead of a gently falling one. The individual ratings for the two- to three-month intervals are given in Table XIII.

TABLE XIII

Service	July-Sept., 1925	Oct.-Dec., 1925	Jan.-Feb., 1926
Alexander Hamilton Institute.....			Fair to good
Babson's.....	Fair	Poor	Poor to fair
Brookmire.....	Fair	Poor	Poor to fair
Harvard.....	Fair	Fair to poor	Fair to good
Moody's.....		Fair	Fair to good
Standard.....	Poor	Poor	Fair to good

The various forecasting charts, including Brookmire's then new Barometer Number 9, failed to predict the price decline and, indeed, indicated about the opposite of what occurred. The Harvard and Standard services were impressed by the condition of easy money, but the Alexander Hamilton Institute looked for a halt in the expansion of credit. Standard, Babson's, and Brookmire were particularly inclined to stress the small inventories, curtailed production, and improving purchasing power, all to the detriment of their predictions.

In general, one is struck (*a*) by the failure of the forecasters to see any particular significance in the deflationary policies of the Federal Reserve banks, (*b*) by their failure to stress any of the international considerations, such as the return of England to gold, and (*c*) the lack of any disposition of the services to predict any such decline in particular commodities (e.g., rubber) as might be reflected in the wholesale indexes.

The upturn of 1927.—The rise in wholesale prices which began around the middle of the year amounted to but 8 or 10 per cent but, unlike the 1926 decline, was rather sharp while it lasted.⁵⁰ The bulk of the rise occurred in farm products, which increased some 19 per cent as against the 5 per cent gain registered by the leading non-agricultural price index. The wholesale indexes of most of the leading countries of the world saw a temporary spurt in the latter half of 1927; and in Germany, Sweden, Italy, and the Netherlands prices increased at about the same time and to about the same extent as our own.

In 1927 the Federal Reserve rediscount rate was not lowered until after prices had turned upward in late July, but the banks began to add to their holdings of government securities as early as April. The amount of such securities held was increased from 305.9 millions of dollars in December, 1926, to 604 millions in December, 1927. The total loans and investments of the reporting member banks gained 1,350 millions of dollars in the same period of time, but interest rates on choice double-name paper held remarkably close to 4 per cent throughout the year. A factor contributing to the favorable credit situation in this country was the inflow of gold, which amounted to about 150 millions of dollars during the twelve months ending June, 1927.

The stock market forecasted a much greater and much earlier rise than actually occurred; for, according to Standard's index, these securities began in June, 1926, an almost uninterrupted rise which carried the index number from 93.2 in May, 1926, to 145.3 in June, 1928. The Standard index of production reached its high point of 122.2 in March, 1927, and worked irregularly downward to 110.5 by the end of the year.

The forecasting services were, on the average, just about half right in their predictions during the first six months of 1927. Up to March none of the services definitely foretold the July upturn, and up to May only one of them definitely predicted it. As the time of the turning-point became imminent, however, four out of six were fairly confident that moderately higher prices were in

⁵⁰ Snyder's index of general prices rose from a low of 169 in May, 1927, to a high of 174 in December.

prospect. As Table XIV shows, most of the predictions were neither very helpful nor very misleading.

The forecasters in 1927 appear to have relied less on their chart barometers than in any of the earlier periods examined. The Brookmire "forecasting line" moved downward and sidewise during the entire period, but the fact that several factors in the barometer turned upward was interpreted as being favorable to an early upturn in prices. The Harvard prediction that the decline probably was not over was made despite the fact that the curve representing money and credit had been favorable for a long time.

TABLE XIV

Service	Dec., 1926— Feb., 1927	March-May, 1927	June-July, 1927
Alexander Hamilton Institute.....	Fair	Poor to fair	Good
Babson's.....	Fair	Good	Fair to good
Brookmire.....	Fair	Fair	Poor
Harvard.....	Poor to fair	Poor to fair	Good
Moody's.....	Fair	Poor to fair	Poor
Standard.....			

The Standard, Alexander Hamilton, Brookmire, and Harvard services all held that the monetary situation was favorable to some rise in prices but for the most part felt that it was not favorable enough to prevent a decline. Babson's guessed that the re-discount rate would not be lowered, and Moody's argued that the new capital seeking investment in new plants was tending toward lower prices.

Babson's, Alexander Hamilton, and Brookmire all looked for higher agricultural prices, which were expected to be reflected in the wholesale price indexes; but Standard argued that the statistical position of a number of industries suggested a further general weakening of prices. The Brookmire Service was impressed by signs that the decline in foreign prices had halted, but the Harvard Service held that foreign prices depended upon American banking policy and were hardly to be regarded as causes of price movements here.

The downturn of 1929.—As a last test of the ability of the forecasters to foretell the turning-points in the wholesale price index, the predictions of the half-year prior to the secondary peak reached in the summer of 1929 were examined rather than those prior to the slightly higher peak in April of the same year.

In view of all that has been written concerning the causes of the 1929-33 price decline, it is sufficient for present purposes to note that the large gold reserves of the country, the high reserve ratios of the Federal Reserve banks, and the absence of any wave of speculation in commodities all seemed not to conform to the usual state of affairs just before a major recession in business and prices.

TABLE XV

Service	Jan.-March, 1929	April-June, 1929	July-Sept., 1929
Alexander Hamilton Institute...	Fair to good	Fair to good	Fair to good
Babson's.....	Fair	Fair	Fair
Brookmire.....	Poor	Fair	Poor
Harvard.....	Fair to good	Fair to good	Fair to good
Moody's.....	Poor to fair	.....	Poor
Standard.....	.....	Poor	Poor

The forecasters, as a group, were certainly not conspicuously helpful in their 1929 price predictions. None of the services definitely foretold a long or drastic price decline, although two consistently held that the next definite movement would be downward and a third strongly recommended a hand-to-mouth buying policy. The other services either saw no convincing evidence that an important decline was in prospect or implied that a rise was more probable than a recession by insisting that no sustained rise was yet likely. On the other hand, no forecaster was so utterly wrong as positively to indicate that a major rise was to be expected. Very little comment concerning commodity prices was made typically during the first half of 1929, indicating that no important move in either direction was clearly foreseen. The ratings for this period are summarized in Table XV.

The chart barometers apparently played little part in shaping

the 1929 forecasts. The Harvard organization held that the curves in its Index Chart were in the position which ordinarily would indicate the approach of a depression, but this conclusion was set aside largely on account of the confidence placed in the ability of the Federal Reserve System to prevent a recession from going very far. The Brookmire Service had already dropped its Barometer Number 9.

The later Alexander Hamilton, Brookmire, and Harvard predictions were definitely strengthened as the result of the emphasis placed on such considerations as the overproduction of non-ferrous metals, the decline in the foreign demand for American goods, and the scattered evidence that stocks of commercial goods were beginning to accumulate. The Babson, Moody, and Standard forecasts, on the other hand, were weakened by the belief that inventories were not burdensome, that there had been no overproduction in consumers' goods, and that agricultural prices promised to move forward. The one argument which most often accompanied or pointed toward an incorrect forecast was that there had been no commodity inflation and that consequently no important decline was called for.

Summary.—The conclusion indicated by the ratings assigned 114 short-term predictions is that the forecasting services have not yet demonstrated their ability consistently and accurately to predict the cyclical swings of commodity prices within six or seven months of the turning-points. Listing first the various ratings according to the year in which the turn was seen, Table XVI shows the number of times the services were rated higher and lower than "fair."

According to this test, which asks merely the relative number of correct and incorrect predictions, ignoring the question how right or how wrong, the services were at least slightly helpful a little more often than they were definitely misleading but were, nevertheless, definitely on the helpful side of the neutral zone in only 45.6 per cent of the instances observed. But, what is more striking, even this degree of success is accounted for by the good record built up in the 1920 and 1922 periods; for in none of the

last five periods did the services as a whole manage to make more predictions which were helpful than were misleading.

In general, the services were conspicuously successful in both 1920 and 1922 but were generally misleading in 1923; thereafter, about one third were helpful, one third neutral, contradictory, or doubtful, and the other third were definitely misleading. The major decline of 1929 was foretold with little more accuracy than the other movements subsequent to the decline of 1923.

The ratings are even less flattering to the services if one

TABLE XVI

Year of Turn	Higher than Fair	Fair	Lower than Fair	Total
1920.....	12	2	2	16
1922.....	13	3	2	18
1923.....	5	1	9	15
1924.....	6	4	8	18
1925-26.....	5	4	6	15
1927.....	5	5	6	16
1929.....	6	4	6	16
Total.....	52	23	39	114
Per cent of total. . .	45.6	20.2	34.2	100

stresses the matter of degree of helpfulness; for of the 52 predictions classed as higher than "fair," 31 predictions (about 60 per cent) were considered only "fair to good," as against 20 predictions (40 per cent) considered "good" or "very good." A larger proportion of the misleading ones, on the other hand, were badly misleading; for of the 39 predictions rated lower than "fair," 27 (or about 70 per cent) were regarded as "poor" or "very poor," as against only 13 (or 30 per cent) classed as "fair to poor."

The showing of the individual services depends upon how often they forecasted and upon how much stress is placed upon the degree of correctness rather than merely upon the number of times the forecasts were on one side or the other of the neutral zone. This may be seen from the record of the ratings listed in

Table XVII according to the number of times each was assigned to the various professional services.

From this it will be seen that the only forecasters who made no definitely misleading predictions during the months covered were the Alexander Hamilton Institute and Thomas Gibson. The former made only a very few commodity-price predictions, and most of these were too vague to be more than slightly helpful. Then, too, predictions of this service characteristically applied to the very short-term future (a month or two), which further limited their scope and usefulness. Mr. Gibson's record was made

TABLE XVII

Service	Very Good	Good	Fair to Good	Fair	Fair to Poor	Poor	Very Poor	Total
Alexander Hamilton.....	.....	1	4	.....	.....	.....	.....	5
Babson's.....	2	1	3	7	4	4	.....	21
Bankers'.....	.....	.....	.....	1	.....	1	1	3
Brookmire.....	3	3	2	3	3	6	1	21
Gibson.....	.....	4	6	2	.....	.....	.....	12
Harvard.....	1	.....	11	4	1	3	1	21
Moody's.....	.....	3	2	4	3	2	.....	14
Standard.....	.....	2	3	2	2	7	1	17
Total.....	6	14	31	23	13	23	4	114

mostly in 1920 and 1922, when most of the other forecasters also did very well, and it would not look so good if one were to insist that his failure to forecast the short-term future of commodities from 1924 on was proof that he was unable to predict it. His predictions were also, as a rule, too vague to be more than moderately helpful.

Of the three services that predicted continuously throughout the decade the Harvard Service received more ratings above "fair" than the others, but only one out of twenty-one of these was more than slightly on the helpful side whereas four were badly misleading. The Brookmire Service, on the other hand, made more "good" and "very good" predictions than any of the others, but it also made more than an equal number of "poor" and "very poor" ones. Babson's forecasts were more often rated "fair"

than were those of any other service, but his helpful forecasts were, to a degree, offset by misleading ones. The unusually large proportion of misleading forecasts made by the Standard Service is partly, but not entirely, explained by the fact that it was not forecasting in 1920 when four of the services made their best predictions. Standard's forecasts, like Brookmire's, were generally made in precise and uncompromising terms, which had the effect of making bad forecasts all the more misleading and dangerous.

In classifying the ratings according to whether the forecasts were made about one, three, or six months prior to the various turning-points, it was found that the helpful and misleading forecasts generally fell in the periods nearest the turning-points,

TABLE XVIII

Number of Months Prior to the Turns	Number Rated Higher than Fair	Number Rated Fair	Number Rated Lower than Fair
4 to 7.....	13	14	10
2 to 4.....	17	6	14
0 to 2.....	22	3	15
Total.....	52	23	39

whereas the "fair" ones most frequently were made a full six months before the turns. The figures are summarized in Table XVIII.

The reason for so many "fair" predictions some six months before the turning-points is found in the system of rating, which gives due credit for a good forecast of the immediate future even if the prediction is deficient in respect to the turning-point lying a little deeper in the future. Being helpful in one respect and misleading in another, such forecasts frequently rank as "fair."

In order to eliminate this bias in favor of the earlier periods the writer has prepared in Table XIX a supplementary list of ratings which is intended to reflect the failure of the services to foresee the next trend, regardless of how helpful the forecast may have been with respect to the months lying between the prediction and the turn.

As a rule, the forecasters either failed to foresee the turning-points six months in advance or, what is worse, predicted the opposite from the actual trend; some three months prior to the turns the forecasters on the average were somewhat less inaccurate; and near the time of the turning-point they were more often helpful than misleading. If one insists that a forecaster should have foreseen the turning-points a full six months in advance to rank

TABLE XIX

Number of Months Prior to the Turns	Number Rated Higher than Fair	Number Rated Fair	Number Rated Lower than Fair
4 to 7.....	9	8	20
2 to 4.....	16	4	17
0 to 2.....	22	3	15
Total.....	47	15	52

higher than "fair," then only 41 per cent of the 114 predictions were helpful as compared with 46 per cent at least slightly misleading and 13 per cent about neutral.

It does not necessarily follow from these low ratings that the forecasters were entirely without honor, for it cannot be taken for granted that the layman would have done as well. It seems quite likely, on the contrary, that pure chance would give a lower average score than "fair."

[To be continued]

Erratum. In Part I of this article which appeared in the April issue of the *Journal*, typographical errors occurred in the first and third dates given in footnote 36. The first date should read June 10, 1922, and the third, July 23, 1927.

THE THREE APPROACHES TO THE PROBLEM OF PRICE PREDICTION. III*

E. W. PETTEE

IN CONSIDERING the underlying assumptions of the forecasters of the wholesale price level as judged from a study of some one hundred and fifty separate predictions, it is helpful to think in terms of three general lines of approach. The first of these emphasizes above everything else the lessons of historical precedent and frequently makes use of elaborate statistical devices known as "chart barometers," "empirical formulas," or "index charts"; the second approach places major emphasis on monetary and credit considerations; and the third attempts to analyze the price situation directly from the side of commodities rather than from the side of the money in whose terms the prices of goods are expressed.

HISTORICAL PRECEDENT AND PRICE FORECASTING

The most obvious method of applying past experience to the problem of economic prediction consists merely of drawing direct analogies between the existing setting and that of some previous comparable situation, and estimating the dimensions of the current cycle on the basis of the span of some other cycle or average of cycles. Such a plan has its full quota of difficulties, for in all probability no two economic cycles are ever exactly alike. Allowance always has to be made for certain differences in the two situations, and, if these differences seem to be more significant than

* This is the last of a series of three articles. The first explained the general procedure followed in rating the predictions and attempted to evaluate the longer-term forecasts. The second attempted to appraise the forecasts made within six or seven months of each of the seven turning-points in the wholesale price indexes which occurred between 1920 and 1929 inclusive. The present instalment examines the assumptions underlying the predictions as judged from the reasons offered by the services in support of the conclusions presented in the market letters. Inasmuch as the articles are in the nature of a summary of a much larger and more detailed study, it has seemed best not to consume the limited space by giving complete references to the scores of predictions evaluated.

the elements of similiarity, the method of direct historical analogy immediately loses its appeal.

That the forecasters as a rule were well aware of the limitations of this method is shown by the small number of occasions on which they openly applied it. As has been shown elsewhere, it was only in six out of thirty-two instances under observation that much reference was made to the history of prices in the formulation of the longer-range price predictions.⁵¹ Direct comparisons with supposedly comparable periods of the past were made even more sparingly by the forecasters of the short-term future, as may be judged in Table XX from the brevity of the list of instances when this technique seems to have been considered significant enough to warrant mention in the market letters. Direct analogy, then, apparently contributed to the success of four predictions (over a period of some six months in each case) and to the failure of three, but twice when the analogies suggested what proved to be sound conclusions, other considerations led the services to make opposite and less successful forecasts.

A more favored method of applying past experience to forecasting is that of utilizing various statistical sequences or some other form of chart barometer. These empirical forecasting devices may or may not be rationalized. The popular general rule that the stock market forecasts the cyclical turns of business and prices, for example, has been defended logically as well as historically, but the rule probably would still be as popular without its logical explanation.⁵² In the same way there has been no lack of reasons advanced for the tendency of the speculative and monetary factors embodied in the Harvard Index Chart to foretell the trend of commodity prices; yet the chart itself was strictly a statistical invention based upon a painstaking testing of some fifty different statistical series against a commodity price curve.⁵³ The factors employed in the Brookmire barometers were likewise supposed to

⁵¹ See the first article of this series.

⁵² See C. O. Hardy and G. V. Cox, *Forecasting Business Conditions* (New York: Macmillan, 1927), pp. 216-27.

⁵³ This goes back partly to the speculation theory but mostly to the interest-rate explanation.

have a logical connection with the price trend, but many others whose inclusion seemed quite as logical were excluded because, when tested mathematically, they did not have a close correlation with the changes in Bradstreet's index of commodity prices.⁵⁴

TABLE XX

HELPFUL USE OF ANALOGY		DAMAGING USE OF ANALOGY	
Service	Technique	Service	Technique
Babson's, 1920....	Comparison with the post-Civil War period suggested a major price recession	Moody's, 1922....	Analogy with other depression years suggested an upturn between July and August (badly timed forecast)
Harvard, 1920....	The 1906 parallel suggested a drastic reaction, but other factors led to the opposite prediction	Brookmire, 1925....	Comparison with the 1897 parallel suggested a moderate price advance
Harvard, 1922....	Analogy with 1900, 1904, 1908, and 1911 suggested a rise of about 10 per cent	Standard, 1925....	Cycle history suggested a continuation of the rise from four to six months beyond August, 1925
Brookmire, 1923....	Cycle history indicated that the period of rising prices would come to an end in a few months, but other considerations led to the opposite forecast		

The forecasting services ordinarily did not count very heavily on such simple rules as the one relating to the stock market. It was commonly recognized that there was a certain element of truth in the general rule that stock quotations rise and fall some months in advance of cyclical changes in the commodity price averages, but there had been in the past a great many instances when that formula could not have been applied in actual practice. Especially during the 1920's would it have been unfortunate had

⁵⁴ Ray Vance, *Business and Investment Forecasting* (New York: Brookmire Economic Service, 1922), pp. 84-90.

the forecasters stressed the stock market as the leading price barometer, for the turns of 1923, 1924, 1925-26, and 1927 all occurred in the commodity price indexes either at about the same time or before the turn in the securities market.

Another of the less complicated statistical series which seemed to hold promise of becoming helpful in the prediction of business and price trends is the Harvard sensitive index. Like so many statistical "forecasters," this series worked splendidly during the test period (1923 through 1925) but not so well thereafter. The sensitive index and the Bureau of Labor Statistics index moved downward together in 1926; and the former anticipated the 1927 rise in the latter by only one month. In March, 1929, the sensitive index fell sharply, but this was negated by a rise of appreciable magnitude that began in June. The index failed to reverse its upward trend until September, 1929.⁵⁵

The more elaborate empirical forecasting devices began to attract favorable attention soon after the close of the World War. Along with the new developments in statistical technique which were being brought to light about that time, there arose a popular expectation that scientific forecasting was at last in the offing. Objective formulas, so the argument ran, would have the advantage of eliminating, or at least minimizing, that element of sentiment and personal bias so hostile to the impartial scientific forecast.⁵⁶

The majority of the forecasting services employed some sort of forecasting chart at one time or other, but the only ones that used and made definite reference to such devices in formulating their price predictions during the months included in this investigation were Babson's, Brookmire, and Harvard. Of the three, the Brookmire Service was most inclined to stand by the mechanical forecasts indicated by its barometer; the Harvard Service often openly distrusted the predictions suggested by the position of the curves of its Index Chart, and on occasions apparently ignored

⁵⁵ For a detailed discussion of this index see S. J. Denis, "The Sensitive Price Index," *Review of Economic Statistics*, February 15, 1932.

⁵⁶ This was a selling point used a great deal by the Brookmire Economic Service; see, e.g., Vance, *op. cit.*, p. 90.

them. The Babson Service as a rule did not make much reference to the "Babsonchart" in connection with its price predictions. The chart supposedly played an indirect part in many of the forecasts, however, for it contributed to the business forecasts, and Babson's commonly assumed that prices would follow the course of business activity.

The writer's impression of the way the chart barometers functioned during the six-month intervals preceding the seven turning-points is summarized in Table XXI⁵⁷

TABLE XXI

Mostly Helpful	Neutral or Not Mentioned	Mostly Misleading
Harvard, 1920 Brookmire, 1920 Babson's, 1920 Harvard, 1922 Brookmire, 1922 Babson's, 1923 Harvard, 1929	Babson's, 1922 Babson's, 1927 Brookmire, 1927 Harvard, 1927 Babson's, 1929	Brookmire, 1923 Harvard, 1923 Babson's, 1924 Brookmire, 1924 Harvard, 1924 Babson's, 1925-26 Brookmire, 1925-26 Harvard, 1925-26

From this it will be seen that the chart barometers were helpful in seven instances, neutral or not mentioned in five, and misleading in eight. They were typically helpful in 1920 and in 1921-22, misleading in 1923, 1924, and 1925-26, and either not emphasized or not used at all in 1927 and 1929. Such a record was not one to provide encouragement for the chartists, especially in view of the fact that the empirical formulas functioned best in the earlier periods rather than in the later ones. The tendency in 1927 and 1929 for the forecasters to mistrust and even ignore the conclusions indicated by a mechanical interpretation of their chart barometers merely reflects a wholesome respect for the fact that those devices had frequently proved misleading ever since 1922.

It seems one must conclude that the mechanical forecasting

⁵⁷ This is my grouping based entirely on the services' own interpretations of what their charts foretold. If the services made no reference to their barometers, I assumed that no definite clue was taken from them. The Harvard final forecasts were significantly different from what the organization said the Index Chart indicated in both 1920 and 1929.

systems not only failed to approach the standard of excellence which had been indicated by projecting them backward over a period of years, but also failed to point definitely toward moderately helpful predictions in as many as 50 per cent of the instances examined. It may be added that not a single forecaster was definitely and consistently successful in making mechanical predictions.

THE MONETARY APPROACH

It goes without saying that our theories have a definite forecasting implication in that they assert that under certain conditions certain results tend to follow. As regards the price level, the central theory, of course, is the variously formulated, controversial, but time-honored quantity theory of money. The early writers who published long-range price predictions, as we have seen, found it very hazardous to forecast on the basis of this theory because of the difficulty of estimating both the supply of money and its future demand. One would naturally expect the practical application of the quantitative assumption to be all the more limited in the sphere of short-term prediction, for it is exactly in the short run that most of the elements assumed to remain the same are in reality most unstable.

The interest rate, in particular, plays such a predominant part in certain of the monetary explanations of the price cycle that one is frequently all but asked to believe that the banks, through their control of the interest rate, possess a sort of push-button control over the price level. Mr. Knut Wicksell some twenty-five years ago offered the following suggestive proposition:

If, other things remaining the same, the leading banks of the world were to lower their rates of interest, say 1 per cent below its normal level, and keep it so for some years, then the prices of all commodities would rise and rise and rise without any limit whatever; on the contrary, if the leading banks were to raise their rate of interest, say 1 per cent above the normal level, and keep it so for some years, then all prices would fall and fall and fall without any limit except zero.⁵⁸

This theory, like so many others, did not point out the way to the forecasters so clearly as it might seem at first blush, for the

⁵⁸ "Influence of the Rate of Interest on Prices," *Economic Journal*, June, 1907, p. 213.

natural rate of which Mr. Wicksell spoke was that rate which would equalize the demand for real capital and the supply of savings. Such a rate itself is supposedly unstable, and the only test offered for judging whether or not the bank rate was higher than the natural rate was to observe whether or not prices were rising. The reasoning back of this theory is closely identified with the quantity theory of money, for it is assumed that the banks, by raising or lowering interest rates, lend less or more—i.e., it is by changing the amount of the circulating medium that banks through their control of interest rates bring about fluctuations in the price level.⁵⁹

It is perhaps safe to say that most students of the price level grant that interest rates and the supply of money and credit may have a more or less direct bearing on prices even though they are not impressed with the significance of the quantity theory of money. One line of argument is merely that a collapse of the credit structure is bound to cause a business collapse, and if business declines, prices too are likely to be forced lower. Another type of reasoning especially popular among business men is that high interest rates lead to high costs and that high costs lead to high prices, the assumption being that what is true of relative prices is true also of the price level.

From the reasons advanced in support of the predictions covered in our appraisal the influence of the monetary considerations on the balance seems to have been as given in Table XXII.

The most striking conclusion to be drawn from this is that the forecasters generally did not find in the monetary outlook any clear-cut guide to the future of commodity prices. On the contrary, it seems quite evident that the analyses of money, credit, and banking policy pointed toward contradictory or neutral forecasts fully half the time, for they were clearly helpful in only twelve instances and definitely misleading in seven out of a total of forty-one cases observed. The monetary approach apparently contributed largely to the success of the forecasters in 1920 and

⁵⁹ The writers who strongly urge the controlling power of the interest rate include such authorities as Gustav Cassel, Irving Fisher, J. R. Commons, R. G. Hawtrey, and J. M. Keynes. These theorists differ, however, in their reasons why interest rates are so important.

1921-22, and to some extent in 1924; it was least helpful in 1923 and 1925-26; and was mostly neutral or not thought significant in 1927 and 1929.

In 1920 most of the forecasters recognized the credit strain and the boosting of the rediscount rates as signs of an approaching deflation of prices, and in 1922 likewise recognized the gold imports,

TABLE XXII

Mostly Helpful	Neutral or Contradictory	Mostly Misleading
Gibson, 1920 Brookmire, 1920 Babson's, 1920 Brookmire, 1922 Gibson, 1922 Harvard, 1922 Standard, 1922 Gibson, 1923 Gibson, 1924 Standard, 1924	Moody's, 1920 Bankers', 1920 Harvard, 1920 Moody's, 1922 Babson's, 1922 Babson's, 1923 Brookmire, 1924 Babson's, 1924 Moody's, 1924 Harvard, 1924 Brookmire, 1925-26 Moody's, 1925-26 Harvard, 1925-26 Hamilton, 1925-26 Babson's, 1927 Brookmire, 1927 Harvard, 1927 Standard, 1927 Babson's, 1929 Brookmire, 1929 Harvard, 1929 Standard, 1929	Brookmire, 1923 Harvard, 1923 Standard, 1923 Babson's, 1925-26 Standard, 1925-26 Moody's, 1927 Moody's, 1929
A. Hamilton, 1927		
A. Hamilton, 1929		

easy money, abundant credit reserves, and a favorable Federal Reserve policy as pointing toward a rise in prices. These signs, however, told nothing very definite concerning the timing of the turning-points. In 1924 the forecasters were somewhat less inclined to stress the favorable credit and banking factors than in 1922, and still less inclined in that direction in 1927. They stressed the unfavorably high discount rates in 1929 but insisted that the credit situation was fundamentally sound.

Possibly it is significant that the monetary considerations proved most definitely misleading in 1923 and 1925-26—the very years when wholesale prices failed to follow the trend of the gener-

al price level as measured by Carl Snyder's index. Far from being greatly impressed by the slight increase in the rediscount rate or by the deflationary open-market selling of securities by the Federal Reserve banks, the forecasting services in 1923 nearly all agreed that the credit and banking position of the country definitely favored higher prices.⁶⁰ The policy of the central banks in 1925-26 was again only very mildly deflationary, so that money was still comparatively plentiful and cheap, which explains the attitude of the services that the monetary factors indicated higher rather than lower prices. If one is willing to judge the forecasts on the basis of Snyder's index in 1923 and 1925-26, the monetary approach will be seen to have yielded fairly satisfactory results during the test period as a whole. On such a basis it proved helpful a total of sixteen times, misleading only three, but still neutral or contradictory twenty-two times.

Aside from the years 1923 and 1925-26, the monetary considerations which tended to detract from a satisfactory prediction of the trend of wholesale prices consisted most often of wrong guesses as to the course of discount rates, of too high estimates of the power of the Federal Reserve banks to cope with falling prices, and of wrong guesses concerning the effectiveness of changes in the money rate. Perhaps the most justifiable criticism of the services is that they assumed in 1929 that the credit and banking system was fundamentally sound chiefly because the reserve ratio of the Federal Reserve banks remained almost as large as in 1923. They were unimpressed by the fact that the loans and investments of the member banks had increased by over fourteen billions of dollars since 1923, i.e., at a rate of 6.5 per cent per year, which is twice the rate of increase of physical production during the same years.

⁶⁰ Total Federal Reserve credit outstanding decreased only by some fifty millions of dollars during the first half of 1923, and bank loans and discounts continued to increase month by month. Nevertheless, a number of economists account for the 1923 price decline, as well as for most of the fluctuations since then, on the basis of the discount policy and open-market operations of the Federal Reserve banks. Two examples are L. D. Edie, "Post-war Fluctuations in Wholesale Commodity Prices," *American Economic Review* (suppl.), March, 1929, and R. G. Hawtrey, *Art of Central Banking* (New York: Longmans, Green & Co., 1933), pp. 207-20.

Although all the services took some account of the money and credit outlook part of the time, not one used this approach exclusively. Thomas Gibson probably stressed the monetary factors most consistently in connection with the short-term predictions, though the Harvard and Brookmire services ran him a close second. The Alexander Hamilton Institute, Babson's, and the Standard services consistently took the credit situation into account although in most instances such considerations seem not to have been the decisive ones so far as their predictions of the near-term price trend were concerned. Moody's and the Bankers' services for the most part avoided the monetary approach.

As to the quantity theory of money, it deserves to be emphasized that no forecaster attempted to make short-term predictions solely and frankly on the basis of that theory as did Professor Irving Fisher in his elaborate long-range forecast of 1912. Rather, the services were inclined to doubt the practical significance of that theory except to the extent of recognizing, in a very general way, that an abundance of money and credit tends in the direction of better business and higher prices. Even those who stressed the causal significance of the monetary factor displayed little interest concerning the processes through which an increase in the volume of the circulating medium affects the price level. Most commonly they were content to look upon an increase in loanable funds as an indication of a better future demand for goods in general, inferring that this better demand would lead to better prices.

There have been instances, it is true, where forecasts apparently failed because they were based too much on some grossly oversimplified concept of the quantity theory of money, but experience had long since taught most forecasters that prices do not have to respond under all conditions to a change in the volume of money and credit available to business men.

In general, interest rates were stressed far more than any other monetary consideration, although such relevant factors as the gold flow, bank reserves, and Federal Reserve banking policy were frequently mentioned. Much complaint was registered concerning the impossibility of predicting just what credit policy would be pursued by our banking authorities, yet little stress was

typically given such revisions of the Federal Reserve rediscount rates as did occur, and still less note was made of the open-market operations of the Federal Reserve banks.

THE NON-MONETARY APPROACH

It is scarcely necessary to emphasize at this point that it is not possible to draw a very sharp line between the "money" and the "goods" approaches to the problem of prices. Both sets of factors have to be taken into account in some measure by every complete explanation of the behavior of the general price level. The quantity theory of money as formulated by John Stuart Mill certainly involves a supply-and-demand analysis in that the supply of goods is closely identified with the demand for money. Those who reject the quantity theory also commonly employ a supply-and-demand theory in that the particular money values making up the price level are made to depend upon the goods situation as well as upon changes occurring directly in the realm of gold. The various theorists, for example, are conspicuously in accord on the point that a general movement of prices may be initiated from the side of production in the event of an improvement in the efficiency of industry leading to an increased output of goods without there being any change on the side of money.

Perhaps the strongest argument tending toward the conclusion that the key to the future of the price level in practice is more likely to be found in the supply-demand conditions of a number of particular commodities than from the side of money, is based on the fact that we generally talk in terms of wholesale commodity price averages rather than in terms of what can properly be called a general price level. In this view, even if one grants the validity of the quantity theory of money, that theory applied to actual prediction loses much of its force for the simple reason that many of the values exchanged against money are not included in the Bureau of Labor Statistics index. So long as our index is based on an average of a limited number of individual price quotations, it seems quite possible that major fluctuations in a few important commodities might, in certain instances, be sufficient to account

for the fluctuations in that index even though the value of money remains the same as before.

Still another line of reasoning back of the notion that a fall in the price level may be traced to the side of goods is that a general depression in a money economy may result from a partial depression through the operation of the forces of supply and demand. A surplus of goods in one field and a low price—so the argument runs—reduce the demand of one significant group of consumers and make it impossible for others to sell commodities at normal prices where only normal production had taken place, and therefore the market becomes glutted, betraying all the evidences of a general overproduction with a general fall in prices. This view, commonly credited to Baron Tugan-Baranowsky,⁶¹ has been much in evidence as an explanation of the 1929-33 collapse of the price level.⁶² The objection to such a theory is that depression does not necessarily have to spread to other industries, for it is possible that the money which consumers take away from the depressed industry will be transferred elsewhere, bringing prosperity and higher prices to some other industry.

Whatever one may conclude as to the logic of the goods approach to an analysis of the wholesale price level, there can be no doubt but that the forecasters usually resorted to it. The writer's impression of the influence of this general approach on the success of the forecasts of the test period is summarized in Table XXIII.

From the reasons given by the services for their predictions, then, such non-monetary factors as were mentioned pointed in the direction of helpful predictions a little more often than in the opposite direction, the totals being 17, 12, and 12, respectively, for the helpful, neutral, and misleading goods arguments.

Turning to the particular non-monetary considerations advanced, one discovers that the forecasters prior to 1924 were frequently misled by the assumption that the course of wholesale

⁶¹ See H. L. McCracken, *Value Theory and Business Cycles* (New York: Falcon Press, 1933), chap. x.

⁶² Thus Henry Clay, the British economist, argues that price declines in a few industries, such as agriculture, shipping, and textiles, led to the general price decline; see Sir Arthur Salter and others, *World's Economic Crisis* (New York: Century Co., 1932), pp. 115-19.

prices could be judged from the level of the costs of production in what were considered "most lines." This general approach seems to have worked definitely to the detriment of the following services: the Bankers' and Harvard services in 1920; the Brookmire, Harvard, and Standard services in 1923; and Moody's service in 1922 and 1927. The high-cost argument, on the other hand,

TABLE XXIII

Mostly Helpful	Neutral or Contradictory	Mostly Misleading
Gibson, 1920 Brookmire, 1920 Moody's, 1920	Babson's, 1920	Harvard, 1920 Bankers', 1920
Harvard, 1922 Moody's, 1922 Standard, 1922	Brookmire, 1922 Gibson, 1922	Babson's, 1922
Babson's, 1923 Gibson, 1923	Harvard, 1923	Brookmire, 1923 Standard, 1923
Standard, 1924	Brookmire, 1924 Gibson, 1924 Harvard, 1924 Moody's, 1924	Babson's, 1924
Brookmire, 1925-26 Moody's, 1925-26 Standard, 1925-26	Babson's, 1925-26 A. Hamilton, 1925-26	Harvard, 1925-26
A. Hamilton, 1927 Brookmire, 1927	Harvard, 1927 Moody's, 1927	Babson's, 1927 Standard, 1927
A. Hamilton, 1929 Brookmire, 1929 Harvard, 1929		Babson's, 1929 Moody's, 1929 Standard, 1929

proved helpful to the Standard Service in both 1922 and 1924. It was also put to good account by Babson's and Thomas Gibson in 1923, but these forecasters held that high costs argued against rather than for a rise in commodities in view of the tendency for mounting costs to encroach upon profits and therefore to discourage business enterprise. In retrospect it seems surprising that any statistical service should have made such statements as that "higher wages have served notice that prices will go no lower," for it was common knowledge before 1920 that costs, especially wages, tend to lag behind changes in the price level.

The services seem to have been much more successful in reasoning from various international considerations to prices than they had been in reasoning from costs to prices. Babson's, Brookmire's, and Thomas Gibson's services consistently took the changing European situation into account, and most of the other services stressed this factor from time to time. The Standard Service was the only one to take the position that foreign trade comprised such a small portion of our total trade as to be of little consequence so far as the American price level was concerned. Babson's Organization was the only service to draw fallacious conclusions from its analyses of the foreign outlook more often than it drew correct ones.

The European situation was interpreted for the most part as being a factor looking toward lower prices in this country, and it was stressed most often in the months preceding the various cyclical downswings of the price line. The Brookmire Service, however, placed some emphasis on the improving export trade early in the years 1924 and 1927. None based a forecast of an upturn in 1922 to any considerable extent on this factor. On the whole, however, these international considerations proved helpful to the forecasters even though they threw no very definite light on such matters as the probable time and extent of the next price movement.

A second application of the non-monetary approach to price forecasting which seems to have stood the test of prediction comparatively well is the practice of reasoning from the outlook for special groups of prices to the outlook for prices in general. As nearly as can be judged from the forecasting letters, this general approach proved somewhat helpful in fourteen instances and misleading just half as often. It was especially helpful in 1922, 1924, and 1927, in which years most of the services were convinced that either raw materials or farm prices were bound for higher levels owing to evidences of shrinking supplies. Now and then, however, the same argument was applied at the wrong time, accounting for most of the bad predictions associated with the analyses proceeding from particular to general prices. Vague statements concerning evidences of a good or poor prospective demand for

goods were commonly made in connection with both the helpful and the misleading forecasts.

It goes without saying that business psychology plays an important rôle in price movements, for in the last analysis credit expansion, speculation, and indeed all buying and selling depend upon mental decisions. Many of the factors already considered—e.g., the volume of borrowing, the course of the stock market, and the size of inventories—may be said to throw light on business sentiment, but there is still a possibility that keen observers may be able to sense changes in the temper of the business community before it is reflected in the usual forecasting data.

The forecasters, at any rate, frequently gave some weight to the more intangible psychological factors, apparently, on the balance, to the advantage of the predictions. This is especially true in 1920, 1923, and 1925-26, when the services stressed to some extent (but evidently not enough) such matters as the possible psychological effect of the Japanese crisis, the growing caution of dealers, the attitude of politicians in high places, the psychological effect of the change in the rediscount rate, and the possibility of borrowers taking advantage of easy credit. If one judges from the market letters, these attempts to gauge the mental reaction of business men proved more misleading than helpful only in one year, 1924, when three services argued that political uncertainties were tending to keep business sentiment extremely conservative. Certain services, of course, made wrong guesses concerning the probable behavior of business men in other years. A typical example is the Harvard argument in 1920 that a price decline would uncover a large potential demand; but the way it worked out was that business men were less willing and able to buy, once prices began to fall.

Inventories in the hands of retailers proved to be a very poor guide to the price forecasters. From 1922 to 1928 most services held that buying in general was from hand to mouth and that inventories were, accordingly, of relative minor importance in the price outlook; but in 1929 four of them seemed all too confident that the absence of large inventories argued strongly against any important decline in prices. It is particularly to be noted that the

year which saw the inventories argument used to least advantage was the very year when the most data on the size of stocks were available. Evidently burdensome inventories generally have been quite as much the result of crumbling markets as the dominant cause of them.

The price predictions were noticeably colored by the forecasters' opinions concerning the state of business and its outlook, for the services usually assumed either that the price and business cycles were identical or that prices would follow the trend of business. In retrospect it is difficult to see how such assumptions could have been very helpful in view of the fact that business activity has not only failed consistently to move upward or downward ahead of prices but also failed to reflect the price trend at all in two post-war periods, namely, 1925-26 and 1927.

E. W. Axe and Ruth Houghton have come to the conclusion on the basis of a statistical study that business activity normally begins to expand many months before an important upswing in commodities sets in, but that commodity prices usually begin to move down ahead of business.⁶³ This rule applied mechanically to the test of prediction would also have proved misleading except in 1922, for in 1924 prices and business turned upward at about the same time, and in 1927 there occurred no business recovery at all.

Nevertheless, several of the forecasters managed to profit from the business-condition approaches in 1920, 1922, and 1929. In 1920 Babson's was impressed by the overextended business situation, and Thomas Gibson saw in the declining profit margins a warning that a wave of cancelation of orders was in prospect. In 1921-22 Harvard, Brookmire, and Babson's felt fairly confident that the slight pickup in business was the beginning of an upswing of the cycle; and in 1929 Moody's, Brookmire, and Alexander Hamilton Institute all expressed the belief that the clouded

⁶³ "Records Show That Business Recoveries Precede Commodity Price Upturns," *Annalist*, July 18, 1930, pp. 102-3. The rule would have been definitely useful in predicting the post-war business recessions only in the 1920 instance. Axe and Houghton did not use the Bureau of Labor index in their demonstration. Even with their own data their formula is of little interest, for in eight of the twenty cases the lag amounted to one month or less, and in eight other cases the lag ranged all the way from eight to twenty-five months.

business outlook suggested lower commodity prices. The business-condition assumption, by the same token, proved misleading in 1923, 1924, and to some extent in 1926 and 1927. In 1923 the Harvard, Brookmire, and Standard services mentioned the increasing volume of business as a reason for anticipating firm or rising prices, Babson's being the only forecaster to consider business overextended at that time. Babson's and Standard both expected a further business recession in 1923 to operate in the direction of lower commodity prices, and Babson's correct business forecast in 1925-26 and its incorrect one in 1927 both tended toward misleading price predictions. On the whole, we are forced to conclude that this general approach did not prove very helpful, and it does not seem to hold out much promise even in the light of the more complete statistical data now in the hands of the services.

Still other considerations played some small part in several of the predictions. Chief among these were strikes, car shortages, seasonal price trends, the relation of the secular to the cyclical movement of prices, and the behavior of the price line itself. Strikes were mentioned by Babson's and Gibson in 1920 as being factors tending to reduce purchasing power; and Brookmire in 1927 held that the coal strike was likely to cause enough speculation to raise prices. Railroad-car shortages were occasionally mentioned by the Brookmire Service as tending to bring about shortages of goods and higher prices. Such an assumption pointed toward an incorrect forecast in 1926 and 1929. In 1923 Babson's argued that the passing of artificial stimulants like car shortages made a decline all the more likely, but the Standard Service at the same moment held that the transportation difficulties might favor lower prices by limiting buying for a time. In 1924 Brookmire offered the improved transportation outlook as a favorable factor. It now seems very unlikely that strikes and car shortages affected the price averages one way or the other. The forecasts on the whole seem not to have been any the better for having taken these factors into account.

The seasonal tendency of commodity prices to strengthen in the second half of the year was stressed advantageously in several instances. Babson's and Moody's looked for higher prices in the

second half of 1924 partly on this account, and Moody's emphasized this factor in connection with its forecast of the upturn of 1927. Seasonal considerations seem not to have given any clue to the timing of any of the downturns of the decade.

Several of the forecasters who were convinced that the long-swing trend of prices was downward argued from time to time that the line of least resistance for the short-term trend also was downward. Such a position proved helpful to Babson's forecasts of 1923 and 1929 and to that of Moody's in 1926; but it tended to mislead both Standard and Babson's in 1927.

There was some tendency for the forecasters to state more or less arbitrarily that a certain price level was or was not too high or too low. Thus Standard and Moody's argued that the absence of price inflation in 1929 made a decline unlikely, and Harvard in 1923 argued in a general way that prices were not too high. As a general rule, however, the services attempted to give more concrete reasons for their forecasts. It is difficult to see any promise in this sort of approach. The popular rule that the momentum of any given price movement argues for its continuance obviously cannot help much when it comes to the prediction of turning-points. It seems quite probable, nevertheless, that the slackening of the rapidity of the various movements has been an important factor in shaping the shorter-term predictions, for the forecasts immediately preceding the turning-points usually were more accurate than those made several months prior to those turns. At any rate, the forecasters rarely mentioned this factor in their market letters.

SUMMARY

The comparative effectiveness of the statistical approach and the non-statistical approaches stressing the monetary and non-monetary factors during the seven test periods of six months each may be summarized briefly as shown in Table XXIV.⁶⁴

⁶⁴ It should be noted that these arguments are set forth as having pointed in one direction or the other. The final forecasts did not necessarily conform to any one or two of these considerations, for other factors may have been regarded as still more significant.

The majority of the forecasting services used some sort of mathematical formula or forecasting chart at one time or another, although only three of them used and made definite reference to such devices during most of the months covered by this appraisal. These mechanical systems failed not only to approach the standard of excellence which had been indicated by projecting them backward over a period of years, but also to point definitely toward moderately helpful predictions in as many as half the instances examined. They were typically helpful in 1920 and 1921-22, misleading in 1923, 1924, and 1925-26, and either not stressed or not used at all in 1927 and 1929. They tended to be either very good or very bad.

TABLE XXIV

Type of Approach	Mostly Helpful	Neutral or Not Emphasized	Mostly Misleading
Chart barometers.....	7 (35 per cent)	5 (25 per cent)	8 (40 per cent)
Monetary arguments.....	12 (30 per cent)	22 (53 per cent)	7 (17 per cent)
Non-monetary arguments	17 (40 per cent)	12 (30 per cent)	12 (30 per cent)

All the services made some use of the monetary arguments in formulating their predictions, but none used these exclusively. The forecasters often failed to see in the monetary outlook any clear-cut guide to the future of wholesale commodity prices. As nearly as could be judged from the market letters, the forecasters' analyses of the money, credit, and banking factors proved definitely helpful in twelve instances (over periods of six months in each case), misleading in six, and contradictory or neutral in twenty-two. Four of the misleading predictions occurred in years when the wholesale price indexes and Carl Snyder's index of general prices moved in opposite directions.

The non-monetary considerations as a class appear to have pointed more frequently toward some definite short-term forecast than did the monetary. The former apparently were helpful in seventeen instances, neutral in twelve, and misleading in twelve. It will be noted that this does not represent any improvement in

accuracy over the monetary approach, for the number of misleading predictions kept pace with the increase in the number of helpful ones. The specific non-monetary considerations most frequently identified with helpful predictions were international factors such as price trends abroad, the foreign-trade outlook, and the prices and the outlook for the prices of particular groups of commodities such as agricultural products. The particular considerations most commonly identified with misleading forecasts were costs of production, the size of middlemen's inventories, and the proposition that prices were or were not high or low enough to suggest an approaching change in trend.

In general, then, this study suggests that the forecasters have been mostly right less than half the time in predicting the cyclical turning-points as much as six months in advance. These findings are decidedly less flattering to the services than one would have expected judging from the other (not comparable) appraisals of the predepression economic forecasts. They are not especially discouraging unless one has to assume that the layman is as much as half-right most of the time or mostly right half the time.

On the whole, common-sense analyses stood the test of prediction a little better than empirical formulas, but neither the monetary nor the goods approaches yielded very encouraging results. In proceeding from the side of money and credit there was no way of telling to what extent, if at all, a given monetary stimulus would be reflected in prices; there was no way of telling how long a time would be required under a given set of conditions for that stimulus to make itself felt; nor was it possible to predict just what credit policy would be pursued by the banking authorities. Seemingly many of the misleading forecasts utilizing the goods approach were less excusable, for in this connection there was noted the use of various assumptions which have no foundation either in orthodox theory or in statistical research. For example, more than one service argued that prices could hardly fall until wages fell, although it is common knowledge that wages usually lag behind commodity prices. Others made much of the point that middlemen's stocks did not appear to be burdensome, as

though inventories ever do seem burdensome until sales fall off or prices collapse. Still others were content to support their predictions with vague statements to the effect that the supply of goods exceeded demand. Nevertheless, the goods approach, like every other approach, falls down principally in that it provides no dependable positive guide to the near-term future of prices. Business sentiment, trends abroad, weather conditions, business activity, and the course of prices of sensitive commodities are all subject to change without notice; and even if they were not, we still have no adequate means of judging precisely their significance in any particular situation.

